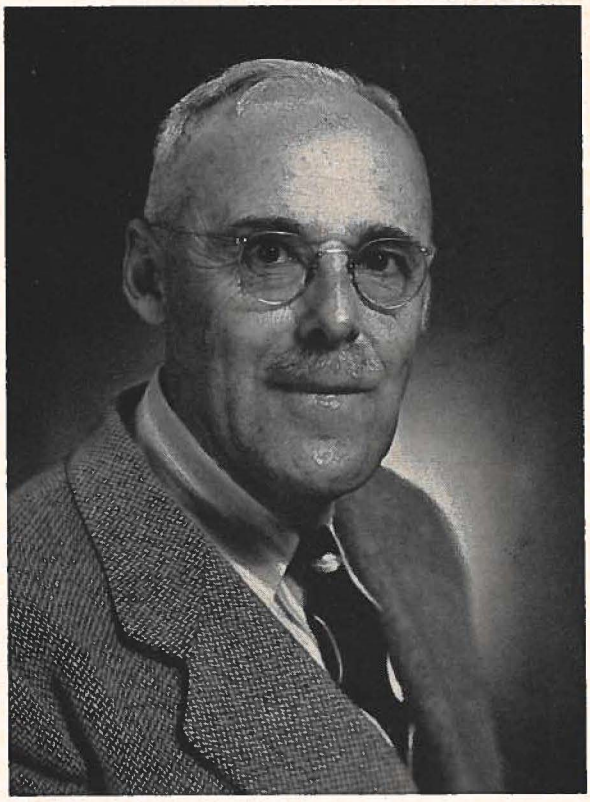
MEMORIAL



JOHN PETER BUWALDA
(1886–1954)

John Peter Buwalda, Professor of Geology at the California Institute of Technology and a member of this Association since 1926, died from a sudden heart attack on August 19, 1954, just as he and his son Robert were returning to the highway after a day reviewing a section along the San Andreas Fault in the vicinity of Frazier Mountain. However hard such an unexpected shock is to family, friends, and colleagues, it must be tempered—in the minds of all geologists—by the thought that this is exactly the way each of us would choose to go, were a choice granted to us.

John Buwalda was born in Zeeland, Michigan, in 1886 of parents who were first generation Hollanders. He took much pride in his ancestry and often humorously referred to the "streak of Dutch stubbornness" he had inherited. The family moved to Yakima, Washington, in 1894, and there John attended grammar and high schools. Entering the University of Washington in Seattle in 1906, he followed for two years a rather broad scholastic program, including courses in geology with C. E. Weaver. Extending his inquiries into related subjects, he became greatly interested in vertebrate paleontology, and

in the spring of 1908 he seriously considered going to the University of California to work under the famous leader in this field, John C. Merriam. However, disturbed by personal matters, including the death of a brother, and with a desire for broader experience, he left college for two years, during which he engaged in a variety of occupations: newspaper work, and mining, logging, and construction operations. In 1910 he enrolled in the University of California at Berkeley, receiving the Bachelor's degree in 1912. There he found what he sought in his work with J. C. Merriam, and under Merriam's inspiration he decided to continue at the University of California for graduate work. At Berkeley, Paleontology is a department separate from Geology, and at that time not many paleontology students elected courses outside their own field. In particular, most paleontology majors eschewed the geology graduate seminars then being conducted by the redoubtable A. C. Lawson. But—and here is where that "stubborn Dutch streak" perhaps served him well—John Buwalda had early recognized that the earth sciences comprise a broad spectrum of disciplines and that he who wishes to succeed in unravelling problems of the earth's crust must have more than introductory courses in several fields. Thus he vigorously pursued advanced studies and research, and participated in seminars under both Lawson and Merriam, and in doing so he earned the lasting respect of these two famous protagonists.

These qualities of John Buwalda—a desire to be fully informed on all aspects of a problem before coming to a decision, and then stubborn defense or vigorous pursuit of the conclusion he had reached, without fear or favor—were characteristic. As another illustration of these qualities, it is of interest to recount that shortly after he came to southern California (1926), he became convinced from his field studies and from earthquake records that, despite the circumstance that southern California had been without any damaging earthquakes for many years, the region was seismically active, and that with the building codes then in existence southern California communities ran the risk of severe earthquake damage. These counsels he voiced at every opportunity, for he was convinced that southern Californians needed to be educated to the situation. Naturally there were many who, quite honestly from different interpretations of the geology or in some cases from purely selfish interests, took issue with him in his evaluation of earthquake danger. But Buwalda pursued his course with characteristic vigor, and the Long Beach quake of 1933 vindicated it in spectacular if costly fashion. The subsequent greatly improved building codes of southern California testify to the value of his counsels.

At the University of California Buwalda earned a Ph.D. in 1915 with a dissertation on a new mammalian fauna from the Tehachapi mountain region of the southern Sierra Nevada. Desiring teaching experience, he accepted the only opening then available, an instructorship in meteorology in the department of geography—remarking, characteristically, that this would afford opportunity to learn something of an important field with which he had been largely unacquainted. In 1917 he was called to Yale as assistant professor of geology. He was at Yale until 1921, when he returned to Berkeley, continuing there until 1926. At Berkeley, in addition to teaching geology, he also served from 1923 to 1925 as dean of the Summer Sessions. In 1926, on the recommendation of John C. Merriam, then president of the Carnegie Institution of Washington, Buwalda was invited by Robert Andrews Millikan to come to Pasadena to develop a Division of the Geological Sciences at the California Institute of Technology. The remarkable growth of the division under Buwalda's guidance was evidenced in many ways. Thus, although the first geology majors only enrolled in 1926, in the decade 1929–1939 the California Institute of Technology ranked sixth among the universities of North America in number of doctorates granted in the geological sciences. Many, perhaps a majority, of these young Ph.D.s had received the bulk of their training from John P. Buwalda. As a matter of fact, Buwalda's "Structural Geology Seminar," although not a required course, was one course taken by practically every graduate student in the division; and many a returning alumnus has been heard

to say "I learned more from Buwalda's seminar than from any other course I ever took at Tech." His teaching program and research supervision were by no means confined to structural geology. For many years he taught the introductory course in geology—a course required of all CalTech undergraduates—and in addition he handled all of the advanced work in engineering geology, groundwater geology, and tectonics, as well as supervising many summer field camps.

In 1935, plans were developed for two new buildings, the Charles Arms and the Seeley G. Mudd Laboratories of the Geological Sciences, dedicated in 1939, to house the expanding needs of the new division. And in 1937 the division, by pre-arrangement with the Carnegie Institution of Washington which had originally developed and subsidized the Seismological Laboratory, took over the administration of this world renowned center for earthquake data and for seismological research, and integrated it into the educational and research program of the California Institute of Technology. These years imposed a particularly heavy administrative load on Buwalda, but there was never an occasion when if even a freshman sought his counsel he would not give freely and patiently of his time. The war years brought severe illness and added burdens, for, with many of his staff away on war work, he undertook to carry much of the teaching load himself. In 1947, at his own request, he retired from the chairmanship of the division but continued to work actively until the moment of his death, in the fields of structural geology, engineering geology, and hydrology. He was, indeed, to have led one of the important field trips (a trip devoted to engineering geology) planned in conjunction with the 1954 Los Angeles meeting of the Geological Society of America.

The contributions of this notable man extended far beyond the scientists he trained and the buildings he designed. Those who knew him best knew that he was a "walking encyclopedia" of geological information on southern California, and knew too that he was always ready to share his knowledge with interested colleagues for their benefit. Through his understanding of structural conditions he contributed greatly to the development of California. As adviser on the San Francisco Bay Bridge and as adviser and consultant to the cities of Los Angeles, Pasadena, San Diego, Santa Barbara, and others, there were not many major constructional undertakings in which his knowledge of foundation conditions and of degrees of earthquake hazard was not first sought. Most notable among these professional studies was his investigation, together with F. L. Ransome, of the most suitable routes, geologically, for the Metropolitan Aqueduct—the "life-line" that since 1941 has brought Colorado River water to southern California. His contributions were legion and much of his knowledge he gave gratis for the public welfare, as for example in advising on well locations for Boy Scout camps, in lectures, in conducted field trips, and in his long service (1928–1954) on the Yosemite National Park Board of Expert Advisers. His professional judgment was frequently sought by litigants, for he was a most effective expert witness, sure of his judgment, forthright in his statements, never perturbed under cross-examination.

To many who knew him only casually and to the younger students who knew him only in the classroom, he seemed austere. Not everyone was privileged to see the twinkle that was in his eyes as with poker face he advanced some unlikely hypothesis, put forward just to draw out a student or to test the student's knowledge of geology—and judgment of his professor!

He was married in 1917 to Imra Wann. She, their four children, Peter John, May Joan, William John, and Robert John, and his mother, Mrs. Eva Buwalda, survive him. He was a member of the American Association for the Advancement of Science, of the Geological Society of America (president of the Cordilleran Section in 1931), the Seismological Society of America (president, 1951–1953), the American Association of Petroleum Geologists, the American Geophysical Union, Sigma Xi, Theta Tau, Sigma Alpha Epsilon,

and Gamma Alpha. A bibliography of his more important contributions is appended.

A broad scholar, a true gentleman, an able geologist, and an effective citizen—John P. Buwalda will be long and well remembered by all who knew him.

IAN CAMPBELL[1]

Pasadena, California
November 9, 1954

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[1] In preparing this necessarily all-too-brief memorial, the writer has benefited from discussions with many colleagues—in particular, Mrs. Imra Wann Buwalda, Robert P. Sharp, and Francis E. Vaughan. It is a pleasure here to acknowledge their helpful commentaries.